6.3 Applications of "*e*" Solutions

Use a scientific calculator to evaluate each expression, accurate to two decimal places (x.xx)

1. e^2

Press $e^x \Rightarrow 2 \Rightarrow$ Enter.

$e^2 \approx 7.389056099$

$e^2 \approx$ **7.39**

2. $e^{\frac{1}{2}}$

3. e^{π}

Press $e^x \Rightarrow \pi \Rightarrow$ Enter.

$e^{\pi} \approx 23.14069263$

$e^{\pi} \approx$ **23.14**

4. $e^{2\pi}$

The population of aphids on a rose plant is given by the following formula: $P = 80e^{0.17t}$, where t is the time elapsed since the prior inspection of the plant. Write your answers rounded to the nearest whole number.

5. Find the aphid population at 3 weeks following inspection.

$P = 80e^{0.17t}$

$P = 80e^{0.17(3)}$

Press

$80 \Rightarrow \times \Rightarrow e^x \Rightarrow (\Rightarrow 0.17 \Rightarrow \times \Rightarrow 3 \Rightarrow) \Rightarrow$ Enter

$P \approx 133.2232956$

$P \approx$ 134 aphids

6. Find the aphid population at 12 weeks following inspection.

Ten grams of tritium will be used in an experiment as a biochemical tracer. The amount of tritium remaining after t years will be $P = 10e^{-0.06t}$. Write your answers rounded to 2 decimals places (x.xx).

7. Find the amount of tritium remaining in 5 years.

$P = 10e^{-0.06t}$

$P = 10e^{-0.06(5)}$

Press

$10 \Rightarrow \times \Rightarrow e^x \Rightarrow (\Rightarrow -0.06 \Rightarrow \times \Rightarrow 5 \Rightarrow) \Rightarrow$ Enter

$P \approx 7.408182207$

$P \approx$ 7.41 grams

8. Find the amount of tritium remaining in 20 years.

Answers: **1.** 7.39; **3.** 23.14; **5.** 134; **7.** 7.41

Use the compound interest formula to find the accumulation amount for each of the following scenarios.

$A = Pe^{rt}$

9. Principal: \$1,500
Annual rate: 7%
Number of years: 1
Compound: continuously

$A = Pe^{rt}$

$A = 1500\, e^{.07 \cdot 1}$

$A = 1500\, e^{.07}$

Press $1500 \Rightarrow \times \Rightarrow e^x \Rightarrow 0.07 \Rightarrow$ Enter

$A \approx 1608.762272$

$A \approx$ \$1,608.76

10. Principal: \$2,100
Annual rate: 6.5%
Number of years: 2
Compound: continuously

11. Principal: \$3,200
Annual rate: 5.8%
Number of years: 3.5
Compound: continuously

$A = Pe^{rt}$

$A = 3200\, e^{.058 \cdot 3.5}$

$A = 3200\, e^{.203}$

Press $3200 \Rightarrow \times \Rightarrow e^x \Rightarrow 0.203 \Rightarrow$ Enter

$A \approx 3920.231898$

$A \approx$ \$3,920.23

12. Principal: \$1,450
Annual rate: 6.7%
Number of years: 2.5
Compound: continuously

Use the compound interest formula to find the amount of money that should be invested for each of the following scenarios to occur.

13. Accumulated amount: \$50,000
Annual rate: 7%
Number of years: 10
Compound: continuously

$A = Pe^{rt}$

$50000 = P\, e^{.07 \cdot 10}$

$50000 = P\, e^{.7}$

$$\frac{50000}{e^{.7}} = \frac{Pe^{.7}}{e^{.7}}$$

$P \approx 24829.2651896$

$P \approx$ \$24,829.27

14. Accumulated amount: \$35,000
Annual rate: 6%
Number of years: 12
Compound: continuously

Answers: **9**. \$1,608.76; **11**. \$3,920.23; **13**. \$24,829.27